"The British Guiana Expedition of Indiana University and the Carnegie Museum," by Dr. C. H. Eigenmann. (Illustrated.)

"A New Museum Case," by Dr. Hermon C. Bumpus.

"The Educational Work of the Buffalo Society of Natural Sciences," by Mr. Henry R. Howland.

"Suggestions for an Educational Exhibit of the Mollusca," by Mr. Frank C. Baker.

"Present Educational Work of the Philadelphia Museums," by Mr. Chas. R. Toothaker.

"What shall we do with our Skeletons and our Fossils?" by Mr. Henry L. Ward. (Read by title only.)

"The History of Commerce in Museums," by Mr. W. H. Schoff.

"Photographic Enlarging Methods," by Mr. Fred. D. Maisch.

"The Adaptation of a Library to a Commercial and Economic Museum," by Mr. John J. Macfarlane.

"Some of the Most Recent Museum Instruments and Appliances," by Dr. M. J. Greenman.

"The Planning and Fitting of Exhibition Rooms, Especially Picture Galleries," by Mr. Wm. M. R. French.

"Art Museums and the Conservation of Monuments," by Mr. Benjamin Ives Gilman.

"The Desirable Projection of Art Museums as suggested by the Desirable Classification of Art Libraries," by Mr. William H. Goodyear.

"The Training of Curators," by Mrs. Cornelius Stevenson.

"Problems of Modernizing an Old Museum," by Mr. Witmer Stone.

"Exhibition Cases without Shelves," by Mr. Frank C. Baker.

"A Device for exhibiting Fadable Minerals," by Dr. Oliver C. Farrington.

"The Uses of a Collection of Historical Coins," by Dr. T. L. Comparette.

"Popular *versus* Scientific Arrangement of Museum Exhibits," by Dr. James E. Talmage.

"Special Work of a State Museum," by Dr. A. R. Crook.

"Progress of the Ohio Archeological Atlas," by Professor William C. Mills.

These papers will appear in full in the annual volume of proceedings, to be published by the secretary during the summer.

The following officers were elected by the association:

President—Frederic A. Lucas, curator-in-chief of the Museums of the Brooklyn Institute of Arts and Sciences.

First Vice-president—Frederick J. V. Skiff, director of the Field Museum of Natural History, Chicago.

Second Vice-president—Edward S. Morse, director of the Peabody Museum, Salem, Mass.

Secretary—Paul M. Rea, director of the Charleston Museum, Charleston, S. C.

Treasurer—William P. Wilson, director of the Philadelphia Museums, Philadelphia.

Councilors (to serve for three years)—James E. Talmage, director of the Deseret Museum, Salt Lake City, Utah; William J. Holland, director of the Carnegie Museum, Pittsburgh.

The fifth annual meeting will be held in Buffalo in 1910.

The association is preparing "A Directory of Museums of Art, History and Science in North and South America," and all museums which have not received circulars requesting information for incorporation in this work are urged to communicate at once with the secretary.

PAUL M. REA,
Secretary
THE CHARLESTON MUSEUM,
CHARLESTON, S. C.

SOCIETIES AND ACADEMIES

THE GEOLOGICAL SOCIETY OF WASHINGTON

AT the 215th meeting of the society, held at the Cosmos Club, on Wednesday evening, February 24, 1909, Mr. David White presented an informal communication on the "Occurrence of Resin in Paleozoic Coals," and exhibited specimens of such fossil resins from the Coal Measures of Iowa, Illinois and Indiana. Amber and other fossil resins occur mostly in Mesozoic and Tertiary coals that have not been much altered, but in coals that have suffered regional metamorphism they are as a rule absent. Where devolatilization has advanced so far that the percentage of fixed carbon is 65 or more they are seldom found.

Regular Program

Correlation of the Rocks of the Boston Region: LAURENCE LAFORGE.

After a brief résumé of the development of the current ideas on the subject, the following outline grouping of the various rocks was described.

There are two series of sediments, Cambrian and Carboniferous. For the fossiliferous beds of lower Cambrian age the name Weymouth formation has been proposed, while the Braintree slate contains a

middle Cambrian fauna, and there is a non-fossiliferous group of quartzites, schists and hornfels, which may be of any age from lower Cambrian to Ordovician. The Carboniferous sediments comprise the so-called Roxbury conglomerate and Cambridge slate.

About forty varieties of igneous rocks are separated into the following groups on the basis of consanguinity, association and structural relations: (1) a "gabbroic" group, including gabbro, basalt, diorite, amphibolite, etc., of presumably Ordovician age, and represented in the diorite complex of Swampscott, etc.; (2) a "tonalitic" group, comprising granite, tonalite and diorite, probably post-Ordovician and pre-Carboniferous, and represented by the granites of Saugus and Dedham, etc.; (3) a "felsitic" group, a complex of felsites, granophyres, tuffs and breccias, of early Carboniferous age, and covering several large areas; (4) a "granitic" group, including granite, quartz porphyry, nordmarkite, etc., represented by the granites of Quincy and Peabody, etc., of Carboniferous age and possibly contemporaneous with the "felsitic" group; (5) a "basaltic" group, represented by the "Brighton amygdaloid," of Carboniferous age, and (6) a "diabasic" group, comprising hundreds of dikes of Triassic age. There are also some pre-Triassic diabases, of as yet uncertain age.

Fluidal Gneiss and Contemporary Pegmatites: Whitman Cross.

In the Needles Mountain pre-Cambrian area in southwestern Colorado there are several granitic batholiths. One of these, called the Twilight granite mass, is intruded in most intricate fashion in steeply upturned Archean amphibole schists.

Both gneissic and schistose textures are exhibited in the intrusive granite. The former is a fluidal texture originating during the consolidation of the granite. Such textures curve in and out among amphibole schist fragments, the sharp angles of which are notable. Where a secondary schistose texture occurs the amphibole schist and granite are both crushed and sheared and it is difficult to determine in certain localities which is the intrusive rock.

Pegmatite occurs as a phase of the granite in arms penetrating amphibole schist or in relatively small dikes connecting larger gneissose bodies. The transition of the pegmatite into gneissoid granite or granular rock and the absence of pegmatitic dikes cutting the latter show that the pegmatite is practically contemporaneous with the granite. None of these pegmatite masses is more than a few inches wide and the minerals are those of the biotite granite.

Pleistocene Geology of the Leadville Quadrangle, Colorado: S. R. Capps.

The work was commenced in 1903 with E. K. Leffingwell, and completed the following summer with the assistance of J. M. Hill and C. A. Kirtley. Of the 950 square miles of the quadrangle, more than 350 square miles have been glaciated. In this area 36 ancient valley glaciers were studied and mapped. Moraines of two distinct epochs of glaciation, one much older than the other, were found. The ice of the earlier epoch covered approximately the same areas as that of the later one.

The great terraces near Leadville, which have hitherto been referred to as lake beds, are probably remnants of compound alluvial fans, deposited as outwash from the older glaciers. This conclusion is based upon the imperfect stratification of the materials, their lack of lake bed structures, the absence of shore lines, and upon the similarity in structure to present alluvial fans. The terraces also show the same amount of weathering as the older moraines, and the topographic relation between the terraces and these moraines is significant. Lower terraces were found which bear similar relations to the moraines left by the last glaciers. The courses of the Eagle River above Redcliff, and of the Arkansas River, near Granite, have been altered as the result of obstruction by the glaciers.

Francois E. Matthes,
Secretary

At the 216th meeting of the society, held at the Cosmos Club on Wednesday evening, March 10, 1909, Mr. Wirt Tassin presented an informal communication on "A Method of Illumination for the Study of Opaque Substances under the Microscope," and showed the apparatus for same in operation.

Mr. F. E. Matthes, on behalf of Mr. R. H. Chapman, gave a brief communication on the Culinan diamond, and showed glass models of the stone in the rough and of some of the larger gems cut from it.

Regular Program

Primary Scapolite in Igneous Rocks: F. C. Calkins.

In the Philipsburg quadrangle, in western Montana, a thick series of sediments, largely calcareous, is invaded by batholiths of rocks allied

to quartz monzonite. Associated with some of these batholiths as marginal facies, as small stock-like masses, and as dikes cutting both igneous and sedimentary rocks, are rocks of aplitic habit characterized by the presence of lime-soda feldspar usually in excess of alkali feldspar, a diopsidic pyroxene, and abundant titanite. Some contain scapolite; in one instance this mineral formed about 20 per cent. of the rock. In this rock the scapolite encloses all the other minerals and interpenetrates with all but quartz and the minor accessories, so that there is no doubt of its primary character. Chemical analyses of two of the scapolite-bearing rocks show the remarkable combination of rather high SiO_2, low MgO and iron oxides, with high CaO and Na_2O; chlorine is more abundant than in most rocks. It is surmised that these unusual rocks have been formed by the solution of limestone in magmas of aplitic composition containing abundant chlorine. No partial stages of the assimilation have been observed, and it probably took place at great depths.

On the Origin of Peat: CHARLES A. DAVIS.

Peat deposits are formed: (1) in depressions below the ground water level, (2) on poorly drained land areas where the ground water level is near but usually below the surface. Deposits on slopes in regions of high atmospheric humidity and on subsiding coasts are included in (2).

In (1) the peat is formed mainly from aquatic plants, including microscopic algæ, the true aquatic higher plants, and a little drift material from the shores. As the peat approaches the water surface, amphibious plants, particularly sedges, other herbs and shrubs, grow out over it from the shore, and form a partly or wholly floating mat, which, later, is invaded by terrestrial plants, including sedges, grasses, ferns, shrubs, sphagnum moss and trees, in the order given. The time when each type appears depends on the height of the surface of the mat above the average water level. Peat formation may go on until the basin is filled, or its surface covered.

In (2) the plants forming the peat are mainly terrestrial, but the types chiefly contributing are controlled by the average height of the ground water level, and climatic conditions. If the ground water level rises with the peat, the entire deposit may be homogeneous, and formed by the same kind of plants; if it remains fixed, the bed is generally thin and varies from bottom to top; if the water rises periodically, the deposit is heterogeneous, with beds of the same structure repeated at intervals.

Decomposition of vegetable matter into peat is principally due to the activities of organisms, the most important being aerobic, hence the top strata of wet peat beds are usually most thoroughly decomposed.

The Landslide at Frank, Alberta: L. D. BURLING.

At 4:10 A.M., April 29, 1903, an amount of rock variously estimated at from 60,000,000 to 100,000,000 tons dropped away from the northeast face of Turtle Mountain, fell through a maximum vertical distance of 3,500 feet, and covered over a square mile of the valley bottom to an average depth of thirty to fifty feet. The slide wiped out the tipple work and buildings of a coal mine at the foot of the mountain, demolished eight houses and a number of smaller shacks and tents, destroyed about two miles of railroad track and killed about seventy people.

Turtle Mountain is an isolated mass situated just south of the Canadian Pacific Railway east of the Continental Divide between British Columbia and Alberta, and towers 3,000 feet above the town of Frank, which lies at its base. The upper part of the mountain is composed of massive upper Paleozoic limestones which dip westward at angles of 20 to 30 degrees. These limestones are thrust over nearly vertical shales and sandstones of Cretaceous age containing a workable coal seam twelve to sixteen feet thick. The strikes of the massive limestones, the thrust plane and the coal beds are very nearly parallel, and for a distance of three quarters of a mile (entirely across the face of the mountain) and for a vertical height of 300 to 400 feet, the entire coal bed had been either loosened or completely withdrawn.

The slide affected only the limestones above the thrust plane. The horizontal distance between the present crest of the mountain and the toe of the slide is nearly two miles, the maximum vertical difference 3,000 feet and the vertical distance between the crest and the toe 2,525 feet. The slope from the crest of the mountain to the lake at its foot is 32 degrees, the first thousand feet having a slope of about 65 degrees. From a width of 2,000 feet at the crest the talus has a width of nearly a mile at the lake, and with minor variations this width is continued to the hills opposite, a mile away.

Whatever may have been the immediate cause of the disaster—the period was one of frequent and marked alternate freeze and thaw, and seventeen men were at work in the coal mine at the time—cracks had been noticed on the back slope

of the former precipitous peak and the slide may have been brought about by some, if not most, of the following contributory causes: (1) the massive limestones forming the upper two thirds of the mountain had been thrust out over the underlying softer shales and sandstones, and therefore may have been in a state of more or less unstable equilibrium; (2) a considerable layer at the base of the massive limestones had been brecciated by the thrust faulting and had thus lost its homogeneity and competency; (3) the limestones forming the upper part of the mountain were very massive and thus more liable to accumulate strain and to give way in a body than would have been the case with weaker rocks; and (4) the opening up of so thick a coal seam, to such a height and for so long a distance in a direction perpendicular to the dip of the massive overlying beds, in rocks incompetent to withstand the pressure thus induced, created strains in the massive rocks from which the support had been removed.

Philip S. Smith,
Secretary

At the 217th meeting of the society, held at the Cosmos Club on Wednesday evening, March 24, 1909, under informal communications, Dr. J. W. Spencer presented briefly some notes on the "Recent Draining of Niagara Falls."

Regular Program

The Composition of Stony Meteorites: Geo. P. Merrill.

The average of a large number of analyses of stony meteorites shows close agreement, after the elimination of the metallic iron, with terrestrial peridotites. From a magma of this kind no amount of magmatic differentiation could produce a series of rocks as rich in silica, alumina, lime and alkalies as those shown by the averages calculated by Clarke and Washington to be characteristic of the earth's crust. World origin through the segregation of materials of this nature is therefore impossible. At the same time it may be conceived that the relative proportion of the elements which make up the mineral matter in the various bodies wandering in remote space, varies widely. If this is so, the earth to-day, in its course, may be passing through and receiving from space deposits of material representing one and the same original body, but not necessarily resembling, in percentage composition, the materials which reached it during past and earlier stages of the earth's history. In brief, the stony meteorites may be regarded as products of an extremely basic phase of magmatic differentiation from a previously more acid magma.

Chemical Composition as a Criterion in Identifying Metamorphosed Sediments: E. S. Bastin.

Chemical criteria need seldom be resorted to for the identification of metamorphosed sediments of a highly siliceous or a highly calcareous nature. They are inapplicable for the identification of many of the metamorphic equivalents of the arkoses, greywackes and similar rocks, since these may be almost identical in composition with the igneous rocks from which they have been derived. Chemical criteria are also inapplicable in the recognition of flow gneisses and of injection gneisses. Such criteria are therefore restricted in their usefulness for the most part to the differentiation of metamorphosed equivalents of the argillaceous sediments from metamorphosed plutonic and volcanic rocks.

The available analyses of metamorphosed igneous rocks show that well-developed foliated structures may in many cases be developed without important chemical changes, and it seems probable that in a very large number, if not in most, of the metamorphosed igneous rocks with which the geologist has to deal the chemical changes during metamorphism have not been severe enough to obscure their igneous characters. They are in many instances still igneous rocks in composition, and the chemical criteria for distinguishing them from metamorphosed sediments may be brought out by a comparison of the latter with normal igneous rocks as tabulated in Washington's tables of analyses.

The chemical characteristics of the argillaceous sediments and the changes they undergo during metamorphism may be determined by a comparison of the averages of a large number of analyses of clays, shales, slates and schists. By comparing these sedimentary averages with the igneous rocks as tabulated in Washington's tables of rock analyses, the following chemical characteristics are shown to be suggestive of sedimentary origin.

1. Excess of alumina (Al_2O_3) above the amount necessary to satisfy the ratio of 1 to 1 with which it is normally combined with lime and alkalies in igneous rocks.

2. Excess of magnesia over lime ($MgO > CaO$).

3. Excess of potash over soda ($K_2O > Na_2O$).

4. In some instances, excess of silica (SiO_2) has confirmatory critical value.

The evidence of sedimentary origin is greatly

strengthened when two or more of the relationships outlined above exist.

The general conclusion reached may be stated as follows: Both igneous and sedimentary rocks undergo chemical changes during dynamic metamorphism. Such changes in the sedimentary rocks are of considerable magnitude and their character is fairly well known. In the igneous rocks changes during dynamic metamorphism appear to be of much lesser magnitude and their character is not so well understood. The lesser degree of chemical alteration that they undergo as compared with the sediments makes it possible to distinguish between the two in many instances on chemical grounds.

Copper-bearing Amygdaloids of the White River Region, Alaska: ADOLPH KNOPF.

The copper-bearing rocks of the White River region, Alaska, comprise a stratiform succession of basaltic amygdaloids, porphyritic sheets, tuffs and breccias, several thousand feet thick, and constitute the dominant portion of a formation of Carboniferous age. In places the amygdaloids are highly zeolitic, and the zeolites form from 25 to 50 per cent. of the bulk of the rock. Native copper has been found intergrown with prehnite, calcite and zeolites filling the vacuoles in the ancient lavas. At some localities veinlets of chalcocite and laumontite cut the volcanics; at others there occur drusy veinlets consisting of quartz, chalcocite and a black combustible mineral, which when ignited burns with a smoky yellow flame. Veinlets of spherulitic prehnite intergrown with calcite and flecked with native copper and chalcocite, also traverse the amygdaloids. The association of a carbon mineral with cupriferous zeolitic amygdaloids appears to be a novel feature, and it is believed to afford a satisfactory explanation for the precipitation of the metallic copper from the mineral-bearing solutions.

FRANCOIS E. MATTHES,
Secretary

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 665th meeting was held in the afternoon of April 26, Vice-president Day in the chair.

At this meeting, which was complimentary to the American Physical Society, Professor Dr. Max Planck, of Berlin, addressed the society, by invitation, his subject being "Die Mechanik als Grundlage der Physik."

THE 666th meeting was held on May 8, 1909, Past-president Marvin in the chair. Two papers were read.

The Star List of the American Ephemeris: MILTON UPDEGRAFF, U. S. Naval Observatory.

Professor Updegraff gave an account of the star list of the "American Ephemeris" as contained in the first volume of that publication, which is for the year 1855, and also of the star lists contained in the five other national ephemerides of that date. He gave in detail the features of the star list of the "American Ephemeris" and "Nautical Almanac" as it will appear in the volume for the year 1912. The number of stars is to be 825: 800 ten-day stars, 15 northern circumpolar stars and 10 southern circumpolar stars; all circumpolars having their apparent places given for every day in the year. Provision will be made for convenient computation of the effect of the short terms of the nutation for each of the ephemerides of the ten-day stars. These short terms at their maxima and minima have an effect in declination of about a tenth of a second of arc, and in right ascension of nearly a hundredth of a second of time multiplied by the tangent of the declination, and are sufficiently large to make it necessary to take them into account in the more accurate kinds of astronomical work.

Attention was called to the fact that in the "American Ephemeris" the short terms have been included in the Besselian and independent star numbers since the volume for the year 1882, and this fact makes it desirable that the effect of these terms should also be allowed for in the ten-day ephemerides of the stars, although they can not be included directly, as the variation is so rapid as to render interpolation impossible.

A brief account was also given of the star lists contained in the issues for 1910 of the four other national ephemerides. Attention was called to the fact that in the new star list of the "American Ephemeris" the constants adopted by the Paris Conference of the directors of national ephemerides, held in 1896, have been used instead of the Struve-Peters constants which have hitherto been used in the "American Ephemeris," excepting the volume for the year 1900, in which the conference constants were used.

An account was also given of Professor Newcomb's suggested list of fundamental stars, which is now used as the basis of the star lists of all the national ephemerides excepting the *Berliner Jahrbuch.*

The Solar Parallax from Observations on the Planet Eros: C. W. FREDERICK, U. S. Naval Observatory.

The discovery of the planet Eros in 1898 gave astronomers an opportunity to make a more accurate determination of the solar parallax, as the new asteroid approached nearer the earth than any other heavenly body except the moon. Accordingly a campaign was planned for the winter of 1900–1, nearly fifty observatories taking part in the work of observing the planet. The reduction of the observations made at Washington has recently been completed, and the resulting value of the solar parallax is $\pi = 8''.808$ with a probable error of $\pm 0''.012$. This indicates a value greater than $8''.800$, which is contrary to the expectation of astronomers.

R. L. Faris,
Secretary

THE AMERICAN CHEMICAL SOCIETY
NEW YORK SECTION

The last regular meeting of the session of 1908–9 was held on May 14.

The following papers were read:

"The Synthesis of 1, 3, 7, 9 Naphthotetrazines," by A. H. Kroppf.

"Peptic Digestion in Aqueous Solutions of Pure Acid Salts," by R. A. Gortner and A. H. Kroppf.

"The Change in Refractive Index with Temperature," by K. Geo. Falk.

"Investigations on the Relative Value of Several Nitrogenous Materials as a Source of Nitrogen to Crops," E. B. Voorhees and J. G. Lipman.

"The Solubility of Salts in Concentrated Acids," by A. E. Hill and J. P. Simmons.

"Congo Blue—Is it a Free Base or a Salt? Congo White—an Aniline Salt of Congo Blue," by I. W. Fay.

"Soluble and Fusible Resinous Condensation Products of Formaldehyde and Phenol," by L. H. Baekeland.

The Rules for the award of the Nichols medal adopted by the New York Section, June 10, 1904, were amended to read as follows:

Rules for the Award of the Nichols Medal
(adopted by the New York Section, June 10, 1904; amended, May 14, 1909).

1. A Nichols medal or medals shall be awarded annually for the best paper presented to the New York Section during the previous season, provided the paper is of sufficient merit. The award may be made to any one, whether a member of the society or not, if the paper is eligible under the following conditions:

(*a*) The paper must embody the results of original research in chemistry, which results shall not have been made public before their presentation to the New York Section.

(*b*) The paper must be presented at a stated meeting of the New York Section between the first day of October and the fifteenth day of June.

(*c*) The paper must be presented in its completed form, unless otherwise specially authorized by the executive committee.

(*d*) Within thirty days after being read before the New York Section, the completed manuscript shall be transmitted to the editor of that one of the society's journals for which the paper seems most appropriate.

2. The jury to determine the best paper among those eligible for the award under the above conditions, shall consist of the editors of the society's publications together with such of the associate editors as they may invite to act with them. The editor of the *Journal of the American Chemical Society* shall be the chairman of this jury. Should the jury thus authorized decline to serve, the executive committee of the New York Section shall designate another jury. The jury shall report their decision to the executive committee of the New York Section, who shall have power to decide whether the paper selected is worthy of the award.

3. The secretary of the New York Section shall send to the editor of the *Journal of the American Chemical Society*, as chairman of the above jury, on or before July 1 of every year, a list of the papers which are eligible under the above conditions, with the request that said jury report to the executive committee of the New York Section by the fifteenth of September next following.

4. In case the paper selected for the award is the work of more than one author, the executive committee may present a medal to every author, the names of all the authors being engraved on each medal.

5. The medal or medals shall be presented at the regular October meeting of the section, or as soon thereafter as may be possible.

6. The executive committee shall have power to decide any question not specifically covered by these rules.

7. Any motion to change or amend these rules must be submitted to the section in writing at least one month before being put to a vote, and notice of the proposed change must be made public at the same time and in the same manner as announcement of the meeting at which the motion is to be put.

C. M. Joyce,
Secretary